Frimley Health
NHS Foundation Trust

# Newly diagnosed diabetes in children and young people under 18 years old (Trust)

**Key Points**

- Diagnosis, assessment and management of children and young people below 18 years of age with newly diagnosed type 1 diabetes
- Risk factors for diagnosis of type 2 diabetes in children and young people and how to manage this

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## Abbreviations

| | |
|---|---|
| BMI | Body Mass Index |
| BP | Blood pressure |
| BSPED | British Society of Paediatric Endocrinology and Diabetes |
| CYP | Children and young people |
| DKA | Diabetic ketoacidosis |
| FBC | Full blood count |
| GAD | Glutamic acid decarboxylase |
| HbA1c | Glycosylated haemoglobin |
| IA-2 | Islet Antigen 2 |
| ISF | Insulin sensitivity factor |
| MDI | Multiple daily injection |
| OGTT | Oral glucose tolerance test |
| PCOS | Polycystic ovary syndrome |
| S/C | Subcutaneous |
| TFTs | Thyroid function tests |
| TTO | Hospital discharge medication (to take out) |

| | |
|---|---|
| U&E | Urea and electrolytes |
| WHO | World Health Organisation |

## Contents

**Introduction** ..... **3**
**Diagnosis** ..... **3**
Diagnostic criteria ..... 3
Type of diabetes ..... 4
**Assessment** ..... **4**
Initial assessment ..... 4
For all patients ..... 4
**Management of newly diagnosed type 1 diabetes** ..... **5**
Summary of initial management ..... 5
Using the insulin bolus calculator app ..... 6
Glucose/ketone monitoring ..... 7
Resources and equipment ..... 7
Child/young person and family education ..... 7
Discharge and medication/equipment to take home ..... 8
**Initial management of presumed type 2 diabetes** ..... **8**
**Reference** ..... **9**
**Full version control record** ..... **10**

## Introduction

- Type 1 (autoimmune) diabetes is the most common form of diabetes in children and young people (CYP) but type 2 diabetes or monogenic diabetes should be considered in some circumstances and discussed with the diabetes team
- All children and young people with symptoms and signs of diabetes should be referred to and seen by the paediatric team on the same day
- Young people aged 16 or 17 years old presenting with diabetes to adult services should be referred for ongoing management under the paediatric team
- All patients with newly diagnosed diabetes should be admitted
- The paediatric diabetes team must be informed on admission so specialist education can commence during working hours:
    - At Wexham Park, please just call ext. 154843 (leave message out of hours) and make a referral to dietitian on Epic
    - At Frimley Park, please inform Diabetes on call consultant by email/phone, PDSN via email (fhft.paediatricdiabetes@nhs.net) or phone (07973 704946), and make a referral to dietitian on Epic
- If specialist advice is needed out of hours, the on call paediatric consultant should contact a paediatric consultant with interest in diabetes
- An out of hours diabetes on call telephone is carried by one of the specialist nurses or consultants for 7 days at a time (5.00pm – 9.00am weekdays, 24 hours weekends and bank holidays); it is predominantly for parental advice but can be used by ward clinicians if the consultant on call or nurse in charge cannot resolve a query – Wexham Park 07824 320846 or Frimley Park 07557 865837.

## Diagnosis

### Symptoms

Most children will present with the classic triad of:

- Polyuria
- Polydipsia
- Weight loss

Other common symptoms can include secondary enuresis, thrush, lethargy, recurrent infections, abdominal pain and vomiting.

### Diagnostic criteria

World Health Organisation (WHO) diagnostic criteria for diabetes based on blood glucose measurement and presence of symptoms:

- a fasting plasma glucose concentration ≥ 7.0 mmol/l **OR**
- two-hour plasma glucose concentration ≥ 11.1 mmol/l after two hours post 1.75 g/kg (max 75 g) anhydrous glucose dissolved in water in an oral glucose tolerance test (OGTT) **OR**
- a random venous plasma glucose concentration ≥ 11.1 mmol/l or validated HbA1c ≥48 mmol/mol with diabetes symptoms (see above) *

*In the absence of symptoms of diabetes, a second measurement should be made to confirm diagnosis

HbA1c is not recommended for diagnosis but any child or young person with an HbA1c ≥48 mmol/mol should be assessed on the paediatric assessment unit (PAU) and discussed with the diabetes team.

### Type of diabetes

Type 1 diabetes is most common. However, consider other causes including Type 2 diabetes and acute infection/steroid induced hyperglycaemia.

Type 2 diabetes should be considered in asymptomatic hyperglycaemia with low ketone levels with:

- high BMI (>85th centile) **AND**
- one or more of the following: first or second degree relative with type 2 diabetes, maternal gestational diabetes, signs of insulin resistance (acanthosis nigricans, high lipids, hypertension, PCOS) or higher-risk ethnicity (South Asian, Black and Hispanic/Latino)

Monogenic diabetes should be considered in atypical presentations or with specific associated health conditions. Initial management is the same as type 1 diabetes with further investigation including additional genetic blood tests to be arranged by the diabetes team.

## Assessment

### Initial assessment

Not all children with suspected diabetes require a blood gas, but this should be performed if the child appears unwell (e.g., lethargy, vomiting, abnormal observations).

If a child is in diabetic ketoacidosis (DKA) (i.e. pH <7.3 or bicarbonate >15 mmol/L, and ketones >3.0 mmol/L), please manage using separate DKA guideline (www.bsped.org.uk/clinical-resources/bsped-dka-guidelines).

### For all patients

1. At triage, capillary blood glucose and ketones
2. Measure height, weight and blood pressure
3. History and examination including focused family history of diabetes and autoimmune conditions.

4. Provide a summary of diagnosis and management to child/young person and family, explaining the diabetes team will discuss in more detail.

5. **Newly diagnosed bloods** – on Epic, search for "WPH Paediatric Diabetes New Diagnosis" or "FPH Paediatric Diabetes New Diagnosis". For FPH patients >11yo, a urine for albumin creatinine ratio should also be sent.

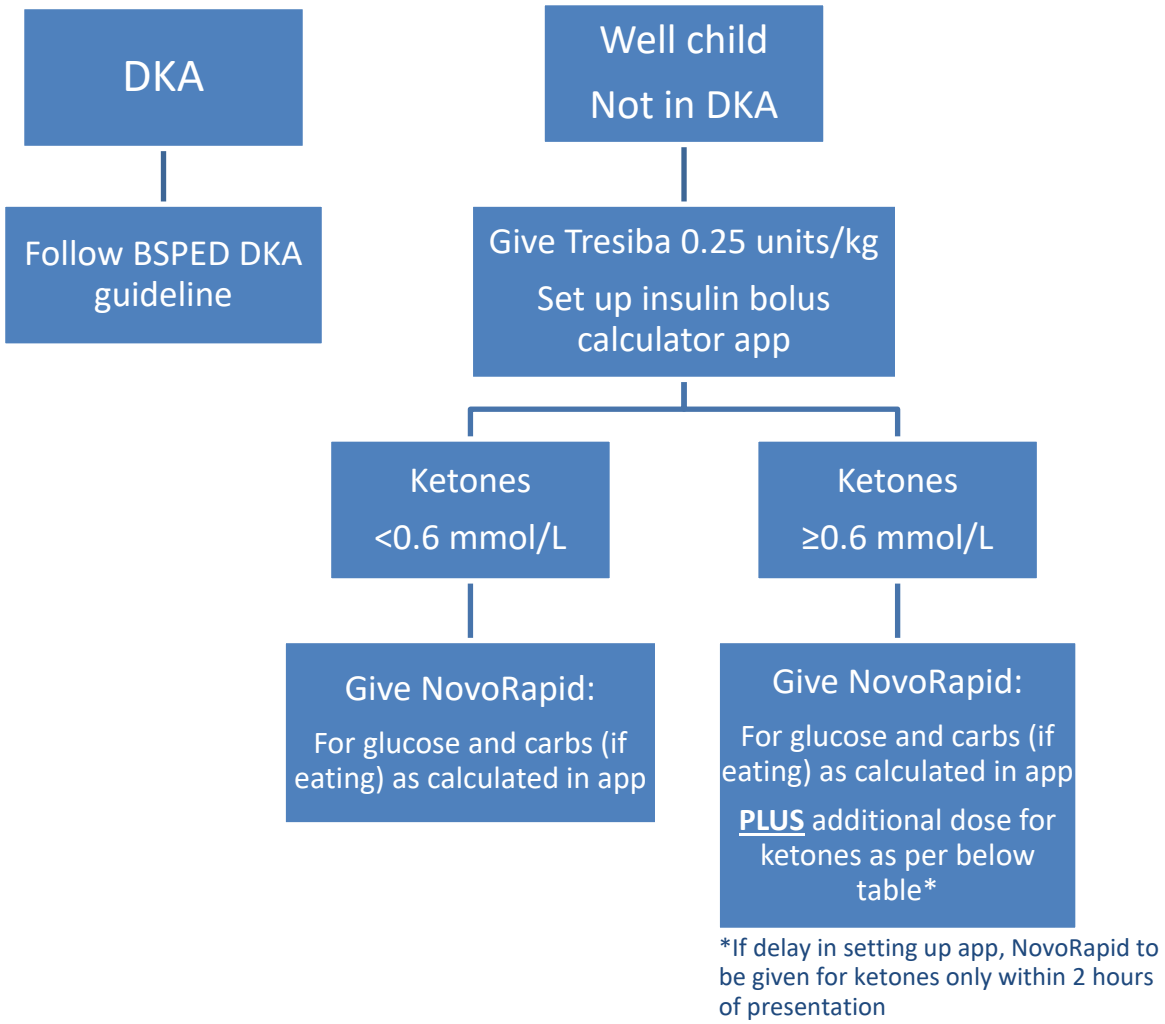
In addition, if the child is unwell (e.g., lethargy, vomiting, abnormal observations):

1. IV cannulation and blood gas

2. Consider infection screening and starting antibiotics

## Management of newly diagnosed type 1 diabetes

### Summary of initial management




Commence a multiple daily injection (MDI) subcutaneous insulin regime with carbohydrate counting:

**Prescribe and give rapid-acting insulin aspart (NovoRapid Penfill 100units/ml solution for injection 3ml cartridges)** up to every two hours - dosing calculated using an insulin bolus

calculator app, with addition of extra insulin dose if ketones ≥0.6 mmol/L (see below). If there is a delay in setting up the insulin bolus calculator app and ketones are ≥0.6 mmol/L, the first dose of NovoRapid should be given within two hours of presentation using the extra insulin dose for ketones only.

**Prescribe and give long-acting insulin degludec (Tresiba Penfill 100units/ml solution for injection 3ml cartridges) 0.25 units/kg** - to be given soon after admission (at any time of day) and repeated every 24 hours until review by diabetes team

NovoRapid dosing

An insulin bolus calculator app should be set up and independently checked by two trained members of ward staff using the step-by-step guide. The initial insulin bolus calculator app settings are by age:

| Age | Max bolus suggestion | Correction Factor | Insulin to Carb Ratio |
|---|---|---|---|
| <2 yrs | 6 units | 10 mmol/L/U | 20.0g Carbs/U |
| 2- 5 yrs | 9 units | 8 mmol/L/U | 15.0g Carbs/U |
| 5 – 12 yrs | 12 units | 5 mmol/L/U | 10.0g Carbs/U |
| >12 yrs | 20 units | 3 mmol/L/U | 10.0g Carbs/U |

The insulin bolus calculator app will add the calculations from both ratios based on the blood glucose and carbohydrate amount entered to advise the total NovoRapid that should be given. **The app WILL NOT add insulin needed for high ketones which you need to do manually:**

## Extra Insulin Doses

| Weight (Kg) | NovoRapid dose (units) | |
|---|---|---|
| | Ketones 0.6 – 1.5 | Ketones Above 1.5 |
| 10 | +1 | +2 |
| 20 | +2 | +4 |
| 30 | +3 | +6 |
| 40 | +4 | +8 |
| 50 | +5 | +10 |
| 60 | +6 | +12 |
| 70 | +7 | +14 |
| 80 | +8 | +16 |
| 90 | +9 | +18 |

**DO NOT GIVE** NOVORAPID INJECTIONS MORE THAN EVERY TWO HOURS WITHOUT DIABETES TEAM ADVICE AS STACKING OF RAPID-ACTING INSULIN CAN LEAD TO HYPOGLYCAEMIA

**Using the insulin bolus calculator app**

1. Measure the blood glucose +/- ketone level
2. If the child is having food or drink, calculate the carbohydrate content (e.g. using food packaging, weighing scales, 'Carbs and Cals', ward breakfast foods list).
3. Enter the blood glucose reading and carbohydrate value into the insulin bolus calculator app
4. If ketones ≥0.6 mmol/L, calculate extra insulin for ketones and ADD to advised insulin dose
5. Give or supervise the insulin dose being given prior to food or drink
6. Ensure the blood glucose/ketone level, food/drink including carbohydrate values and insulin dose is documented on the patient's record, including signing the insulin prescription with the time of administration.

**Glucose/ketone monitoring**

Blood glucose and ketone levels should be checked at any time when the child/young person is unwell or there are concerns. All measurements should be documented on the patient's records.

When blood glucose is >14 mmol/L and/or ketones ≥0.6 mmol/L, blood glucose and ketones should be checked every two hours.

Otherwise, glucose should be checked on waking, pre meal/snack, 2 hours post meal/snack and at bedtime. On the first night of admission, glucose should also be checked at 22:00, 02:00 and 06:00. If continuous glucose monitoring has been started, the sensor reading can be used unless it is not in keeping with the child's symptoms or clinical situation.

Glucose <4 mmol/L is hypoglycaemia and should be managed as per hypoglycaemia guidelines.

Blood ketones should be checked again if blood glucose is >14 mmol/L for over two hours or the child/young person is unwell.

**Resources and equipment**

Please collect a newly diagnosed type 1 diabetes bag from the diabetes office which includes:

- our newly diagnosed information pack
- the step-by-step guide for setting up the insulin bolus calculator app
- insulin pens
- patient's own blood glucose/ketone meters and lancet device
- 'Carbs and Cals' book

**Child/young person and family education**

The ward team have a crucial role in supporting education from the diabetes team. Please escalate any urgent queries to senior members of the ward team and speak to the diabetes team if you would like further training. If a family ask questions you are unable or not sure how to answer, reassure them that the diabetes team will provide further information and suggest they make a note of their thoughts.

It is important for children and parents to take responsibility for their own injections and blood glucose/ketone checks during their hospital admission. This is to enable early discharge from hospital. The demonstration of injection and blood check technique should be carried out by the ward nurse.

If the child is < 7 years old, each parent/guardian should have administered at least 2 injections and checked 4 blood glucose levels prior to discharge.

If the child is 7 years or older, s/he should be encouraged to do his/her own injections and blood sugars. In addition, one parent/guardian should have administered at least 2 injections and checked 4 blood glucose levels prior to discharge.

**Discharge and medication/equipment to take home**

At discharge, please make sure that the child/young person has:

- TTO from hospital pharmacy:
    1. NovoRapid Penfill 100units/ml solution for injection 3ml cartridges - 1 box (5 cartridges)
    2. Tresiba Penfill 100units/ml solution for injection 3ml cartridges - 1 box (5 cartridges)
    3. Glucagon (GlucaGen Hypokit 1mg powder and solvent for solution for injection) - 500 micrograms if body weight <25 kg, 1 mg if body weight ≥ 25 kg – 2 kits
- Their newly diagnosed bag and all equipment
- Collected their supplies from their GP (the diabetes nurses will send a GP letter with a list of items required on repeat prescription to the surgery). Other diabetes medication does not need to be requested from the hospital pharmacy unless requested by the diabetes team.
- Discharge summary including diagnosis and brief summary of presentation/management. The diabetes team will organise outpatient follow-up including chasing any outstanding bloods from new diagnosis panel e.g. autoantibodies, c-peptide.

**<u>Initial management of presumed type 2 diabetes</u>**

If there is diagnostic uncertainty, treat as type 1 diabetes as above while awaiting diabetes team input.

If features strongly suggestive of type 2 diabetes (i.e. multiple risk factors, no acute symptoms, low ketones):

- New diagnosis bloods and blood glucose monitoring as per type 1 diabetes guidance
- In addition, 4 hour blood pressure checks throughout admission and early morning urine albumin creatinine ratio
- Give newly diagnosed type 2 diabetes bag from the diabetes office and outline mainstay of management with lifestyle modification supported by medication
- If 10 years or over and no contraindications (e.g. acute illness/infection, risk of dehydration, acidosis, renal impairment), start metformin 500 mg modified-release tablet once at night (dose will be increased gradually by diabetes team)
- If HbA1c available and ≥70 mmol/mol, start long-acting insulin (insulin degludec/Tresiba) 0.25 units/kg at night in addition

## Reference

British Society of Paediatric Endocrinology and Diabetes (n.d.) *BSPED DKA guidelines*. Available at: https://www.bsped.org.uk/clinical-resources/bsped-dka-guidelines/ (Accessed: 26 November 2026).

## Full version control record

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| **Version:** | 1.0 |
| **Guidelines Lead(s):** | Dr Sejal Patel (Paediatric Consultant, Diabetes Lead) |
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| **Pharmaceutical dosing advice and formulary compliance checked by:** | Rashmi Selli (Principal Pharmacist, Women and Children's Services) 21/10/2026 |
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This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date.
This guideline is for use in Frimley Health Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

## Version Control Sheet

| Version | Date | Guideline Lead(s) | Status | Comment |
|---|---|---|---|---|
| 4.0 | Dec 2022 | Paediatric Consultant, Diabetes Lead | Final | Approved at Paediatrics CG 17 November 2022 |
| 1.0 | Oct 2026 | Paediatric Consultant, Diabetes Lead | Final | Updates:<br>Now cross-site guideline<br>Change of long-acting insulin from Lantus to Tresiba<br>Reference to generic insulin bolus calculator app rather than *mylife*<br>Minor updates and clarifications<br>**Ratified at:** Paediatric Clinical Governance 19/11/2026<br>**DTC:** 11/11/2026 |

## Related Documents

| Document Type | Document Name |
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